DOCUMENT RESUME

ED 078 967 PS 006 743

AUTHOR	Masters, John C.; Christy, Monica C.
TITLE	Achievement Standards for Contingent Self-Reinforcement: Effects of Task Length and Task Difficulty.
INSTITUTION	Minnesota Univ., Minneapolis. Inst. of Child Development .
PUB DATE	73
NOTE	22p.; An abbreviated account of this experiment was presented at the biennial meeting of the Society for Research in Child Development (Philadelphia, Pa., March 29 - April 1, 1973)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Early Childhood; *Elementary School Students; Grade 2; Individual Development; *Reinforcement; Self Evaluation; *Self Reward; *Socialization; Task Performance

ABSTRACT

It was hypothesized that socialization within an achievement-oriented culture would encourage children to adjust the amount of contingent self-reward according to the length and difficulty of a task. A total of 32 second grade children completed long-easy, long-difficult, short-easy, and short-difficult versions of three tasks and set their own amount of reward following each. Long tasks were judged to merit greater amounts of reward than shorter ones, but the effect of difficulty varied across tasks. It is proposed that an additional factor, namely the quality or accuracy of performance, was also governing level of self-reward. Individual differences in amount of self-reward were consistent across tasks. (Author/ST)

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED 078967

ACHIEVEMENT STANDARDS FOR CONTINGENT SELF-REINFORCEMENT: EFFECTS OF TASK LENGTH AND TASK DIFFICULTY

ABSTRACT

It was hypothesized that socialization within an achievement-oriented culture would encourage children to adjust the amount of contingent self-reward according to the length and difficulty of a task. Second-grade children completed long-easy, long-difficult, short-easy, and short-difficult versions of three tasks and set their own amount of reward following each. Long tasks were judged to merit greater amounts of reward than shorter ones, but the effect of difficulty varied across tasks. It is proposed that an additional factor, namely the quality or accuracy of performance, was also governing level of self-reward. Individual differences in amount of self-reward were consistent across tasks.

PS 006743

ACHIEVEMENT STANDARDS FOR CONTINGENT SELF-REINFORCEMENT: EFFECTS OF TASK LENGTH AND TASK DIFFICULTY

John C. Masters
University of Minnesota

and

Monica C. Christy
University of Minnesota

One legacy of an achievement-oriented culture is the internalization of standards for the contingent self-dispensation of reinforcement. For example, recent studies have shown that information concerning success or failure (defined by the comparison of one's performance level to the typical performance of some reference group) exerts a powerful influence upon children's subsequent level of contingent self-dispensed reward (Masters, 1972; Masters & Peskay, 1972; Mischel, Coates, & Raskoff, 1968). In evaluating the hypothesis that children may increase their self-reinforcement following both success ("self-congratulations") and failure ("self-therapy"), Masters (1972) found that children increased their contingent and noncontingent self-reinforcement following success on a task while following failure children increased their self-dispensation of reward only when such reinforcement was noncontingently administered or was administered contingently or noncontingently during a task dissimilar to the one on which failure was experienced. It has also been proposed (Masters, 1973) that success and failure experiences are not effective in determining self-reinforcement when such success or failure is defined by the comparison of a child's performance to that of a single peer rather than an entire reference group ("other children your age" for example).

Clearly, young children make reasonable complex judgments concerning their performance in order to determine appropriate levels of contingent self-reinforcement. Given the values inherent in socialization within an achievement-oriented culture, it seems reasonable that such judgments might come to include not only variables like the success or failure of

one's efforts but also aspects of the tasks which have been correlated with the sanctioning of high (or low) levels of reinforcement. For example, in our culture it seems likely that the simple completion of tasks requiring lengthy involvement or those judged difficult (regardless of the length of time required for completion) would be deemed worthy of high levels of self-dispensed reward. The present study investigated this hypothesis.

Seven- and eight- year-old children completed several versions of a form discrimination task, a card sorting task, and an arithmetic task. Each task came in four combinations of length and difficulty: long and difficult, long but easy, short but difficult, and short and easy (determined by pilot testing of children's judgments of difficulty and the length of time required to complete the various versions). These tasks were presented in randomized order and, following the completion of each, children were given the opportunity to reward themselves, setting the amount of their own reward. It was predicted that hard tasks and long tasks would be followed by increased levels of self-reinforcement. The three different tasks were included to ascertain the generality of this effect. Furthermore, it was predicted that there would be a significant correlation between the amount of time children actually spent on a task and the amount of reward they self-dispensed for that task. In line with prior results (Masters, 1968) it was predicted that there would be a high degree of intercorrelation among the amounts of reward dispensed following performance on the different tasks. And finally, given consistency in children's capabilities and work habits it was also predicted that there would be significant intercorrelations among the amounts of time children actually required to complete the various tasks.

METHOD

Subjects. Thirty-two second grade children from a suburban school system served as subjects. There were an equal number of children of each sex. Experimenters were two female university students.

Tasks. Three tasks were selected for study on the basis of their divergency from one another. This was done to increase the test of the generality of children's judgments across a wide variety of tasks.

Card sorting task. In this task children sorted cards on which reasonably complex forms were depicted. The difficulty dimension was defined in terms of the number of dimensions by which the cards were to be sorted into groups (hard = three dimensions; easy = two).

Arithmetic task. In this task children performed various arithmetic operations such as counting and circling a number (easy) or adding numbers (hard).

Form task. In this task children were given a sheet of paper with a model form at the top and pictures of a variety of forms below and they were to draw a line through all forms matching the model. The complexity and similarity of the forms were varied to create the difficulty dimension.

For all tasks, the length (actual number of cards to sort, problems to work, forms to cancel) was varied independently of difficulty level.

Pilot testing. Prior to the experiment extensive pilot testing was carried out to create long-difficult, long-easy, short-difficult, and short-easy versions of the three tasks. Seventeen second-grade children participated in the pilot study. All children were timed in their completion of the four versions of each task and gave difficulty ratings as well. Every attempt was made to create versions of each task for which

length and difficulty were independent dimensions such that easy and hard versions did not differ in terms of time to completion and within either difficulty level the short and long versions did not prove different in their difficulty ratings. Perfect independence proved impossible; instead, it was the case that the difference in time taken to complete short and long versions of a task were highly significant and were far greater than time differences for hard and easy versions. Similarly, the difference in difficulty ratings for easy and hard tasks was highly significant and was much greater than the difference in difficulty ratings for short and long tasks. Table 1 presents the pilot study data.

- - - - - - - - - - - - -

Insert Table 1 About Here

- - - - - - - - - - - - -

Procedure. Children were brought from their classroom into a small experimental room. In a randomized order, all children completed four versions of three tasks, or 12 tasks overall. They were told that some of the tasks were easier than others and some took longer than others. Furthermore, each child was told that following the completion of each task he would be allowed to determine how great a reward he had earned. He was shown a small plastic token and it was explained that these tokens could be exchanged for prizes, with larger prizes requiring more tokens.

Each task was placed on a table in front of the child and he was asked to begin. The experimenter timed each child's performance with a stop watch. When a child indicated that he was done, the experimenter placed 10 tokens on the table and the child was to pick up the number of tokens which he felt his performance deserved and deposit them in a special box. When all 12 tasks had been completed, the child's tokens were stored for future redemption and he was escorted back to the classroom.

Measures and analyses. The two measures available for analysis were the time taken to complete each task and the number of tokens contingently self-dispensed. Analyses of variance examine the effect of task, task length, task difficulty, and sex of child on these measures. Intercorrelational analyses examine the consistencies in time taken to complete tasks of various lengths and difficulty levels and the number of tokens contingently dispensed following tasks of various lengths and difficulty levels. Also presented are correlations between the amount of time taken on the various tasks and the numbers of tokens self-dispensed.

Results

Time to completion. The data on time taken to complete the various tasks were subjected to a four-way analysis of variance in which the primary dimensions were Sex of child, Task, Length, and Difficulty. Table 2 presents the results along with the means for the significant effects and interactions. There was a main effect of task ($F = 36.20$, 2/60, $p < .01$), indicating that the card task took longer to complete ($M = 73.34$ sec.) than did either the arithmetic ($M = 50.91$) or form tasks ($M = 52.77$). There was a main effect of length ($F = 523.51$, 1/30, $p < .01$) indicating that long tasks took longer to complete ($M = 80.90$ sec.) than did shorter ones ($M = 37.11$ sec.). There was also a main effect of difficulty, indicating that difficult tasks took somewhat longer to complete ($M = 63.97$ sec.) than did easier tasks ($M = 54.05$). Clearly, the difference in time taken to completion was far less for the difficulty dimension than for the length dimension.

PS 006743

Furthermore there were a number of interactions. The difference in time taken to complete difficult and easy tasks was greater for girls than for boys ($F = 6.11$, 1/30, $p < .05$). The effects of length and difficulty each varied as a function of the task: the difference in time

taken to complete longer and shorter tasks was less for the form task than for the other two tasks ($F = 42.96$, 2/60, $p < .01$) and the difference in time taken to complete the easy and hard tasks was least for the Arithmetic task, greater for the Card task, and the greatest for the Form task ($F = 5.14$, 2/60, $p < .01$). Finally, there was a three-way interaction between task, length, and difficulty ($F = 7.23$, 2/60, $p < .01$). Follow-up analyses of variance revealed that there was a significant effect of length in all three tasks (all F's > 100), an effect of difficulty in the Card ($F = 7.00$, 1/31, $p < .05$) and Form tasks ($F = 61.94$, 1/31, $p < .01$), and an interaction between length and difficulty in the Arithmetic task ($F = 7.03$, 1/31, $p < .05$).

Self-Reinforcement. These data were also subjected to a four way analysis of variance in which the primary dimensions were sex of child, task, length and difficulty. Figure 1 illustrates these results. There was a main effect of task length ($F = 18.82$, 1/30, $p < .01$) indicating that children rewarded themselves more generously after completion of a longer task

- - - - - - - - - - - - - - - - -

Insert Figure 1 About Here

- - - - - - - - - - - - - - - - -

than following a shorter one. Furthermore there was an interaction between task and difficulty ($F = 7.41$, 2/60, $p < .01$). Follow-up analyses indicated that there was no significant effect of difficulty upon self-reinforcement following the Form task. Following completion of the Card task children rewarded themselves significantly more generously if the task had been hard than easy ($F = 4.55$, 1/63, $p < .05$), whereas following completion of the Arithmetic task children were more generous if the task had been easy than if it had been difficult ($F = 11.17$, 1/63, $p < .01$). It is apparent, then,

that the effect of length upon level of self-reinforcement is reasonably independent of the task, while a task's difficulty level may have different effects upon self-reinforcement depending upon the nature of the task.

Intercorrelations. Table 2 presents the intercorrelations among the amounts of time children took to complete the various tasks. On the Card

- - - - - - - - - - - - -

Insert Table 2 About Here

- - - - - - - - - - - - -

and Form tasks there appears to be reasonable consistency among individual differences in the amount of time required to complete the tasks of various lengths and difficulty levels (Card task, median r = .55; Form task median r = .63). On the Arithmetic task, however, even though some consistency is present it is rather low (median r = .28).

Table 3 presents the intercorrelations in the amount of reward children self-dispensed following completion of the various tasks. In this case there does not appear to be any great difference in the consistency of individual differences as a function of task. Generally, the intercorrelations are quite high (median r = .59).

- - - - - - - - - - - - -

Insert Table 3 About Here

- - - - - - - - - - - - -

Table 4 presents the correlations between the amount of time taken to complete tasks of the various lengths and difficulties and the amount of reward children dispensed to themselves in each instance. Contrary to expectation, there was no relationship on an individual difference level between these two variables. Apparently gross differences in the length

of a task (time to completion) influence level of contingent self reinforcement, but small differences, caused perhaps by variance in one's own capabilities, do not.

- - - - - - - - - - - - - -

Insert Table 4 About Here

- - - - - - - - - - - - - -

DISCUSSION

The finding that both the length and difficulty level of tasks affected the amount of time taken was more pronounced in the experiment than it had been in the pilot study. The fact that both variables affected the true amount of time taken to complete the tasks poses the possibility that any effects of difficulty level might be attributable to the actual length of the task. We reject this possibility, however, because the effect of difficulty level upon amount of self-reinforcement was not always similar to the effect of length. For example, the long versions of both the Arithmetic and Form tasks resulted in greater levels of self-reinforcement than did short versions, but easy versions of these tasks resulted in greater self-reward than did difficult ones.

It seems reasonable, then, to conclude that the length and difficulty of a task are two relatively independent determinants of a child's judgment concerning the appropriate amount of contingent reward to be self-dispensed. The effect of length seems rather straightforward: the completion of long tasks of various types is judged to merit greater reward than does the completion of shorter tasks. On the other hand, certain characteristics of a given task may modulate the effect of task difficulty on the self-determined amount of reinforcement. The difficult version of the Card task resulted in greater levels of self-reinforcement than did the easy version, but contrary to prediction on both the Arithmetic and Form tasks the easy version resulted in greater self-reward than did the difficult versions. The question may be asked, then, whether there is any parameter with respect to which the Arithmetic and Form tasks are similar and the Card task is not, and whether that parameter might be

related to the determination of self-reinforcement levels.

We believe there is such a characteristic, namely whether or not a child was able to review and assess the quality or accuracy of his performance directly, not from memory, while determining the amount of contingent self-reward. The Arithmetic and Form tasks were the only ones for which the children could review their performance during the self-reinforcement period since the tasks were still on the table (the Card task was also still visible, but the cards were stacked on top of each other and thus unavailable for inspection). Children may have increased their self-reinforcement following easy tasks when their review of the task revealed that their accuracy had been high, which was generally the case because of the ease of the task (it was also easy to judge accuracy on the easy tasks). Thus, when accuracy information is lacking, difficult tasks may be deemed worthy of greater self-reinforcement than easy ones. Contrariwise, when information on the relative difficulty of a task is lacking, estimates of quality and accuracy may become a primary source for judgments of deserved amounts of self-reward. This hypothesis deserves further study.

There were significant intercorrelations among the amounts of time taken to complete the various forms of only two of the three tasks. This differential consistency may be interpreted in the light of prior work on children's "conceptual tempo" (Kagan, 1965). This concept assumes stable individual differences in the solution of problems characterized by uncertainty and for which there are a number of alternative responses available at any one time (Ridberg, Parke, & Hetherington, 1971). In the present study only the Card and Form tasks were generally consonant with this limitation: the cards were to be sorted into a number of

categories with no prior clues as to the nature of these categories; the Form canceling test has great resemblance to Kagan's own Matching Familiar Figures test, and the systematicity of children's performances on that test was instrumental in the evolution of the concept of conceptual tempo. These were the only two tasks producing significant intercorrelations among the amounts of time required for completion of all versions of the various tasks.

In general there was a very high degree of individual consistency in the number of tokens dispensed following performance on the various tasks. In an earlier study, Masters (1968) found great consistency in the generosity with which different rewards were dispensed following performance on a task: the median correlation between the number of tokens (worth prizes), pennies, and worthless scraps of paper self-dispensed was +.71. These consistencies are far higher than those typically found in the individual differences literature (Mischel, 1968), perhaps surprisingly so. It seems likely, however, that the socialization of self-rewarding behavior includes not only the acquisition of criteria for self-reward (Bandura & Kupers, 1964; Mischel & Liebert, 1966) but also leniency or stringency in the amount or generosity of such reward. In an achievement-oriented society an individual child may receive consistent socialization by a limited number of agents (parents, teachers) across a large number of situations and tasks and a large variety of reinforcers, thus producing rather stable individual differences over both these variables. To test this hypothesis, naturalistic observational studies of self-reinforcing behavior and the socialization of this behavior would be in order.

Contrary to prediction, individual variance in the actual amount of

time taken to complete a particular task was unrelated to the amount of self-dispensed reward, while gross differences in task length had a powerful effect on levels of self-reward. This may indicate that the effect of task length is not solely a function of the actual, absolute number of seconds or minutes required to complete the task but rather a comparative judgment, of a rather gross sort, concerned with whether the task is long or short relative to other reasonably similar tasks. In any event, the effect of task length is clearly due to gross differences between tasks of divergent lengths and the specific amount of reward self-dispensed is not related to small degrees of variance in the actual amount of time taken to complete a specific task.

Prior studies of the criteria for children's contingent self-reinforcement have provided miniature socializing experiences for children, such as exposure to a model, and then assessed the degree to which the child's standards are affected by these experiences (Bandura & Kupers, 1964; Bandura & Whalen, 1966; Masters, 1973; Mischel & Liebert, 1966). Even in studies involving very young children, however, subjects come to the experiment with some history of natural socialization, and with respect to self-reinforcement there have been few studies which have attempted to elucidate the criteria for such contingent self-reward which are instilled by our society (Masters, 1972; Masters & Peskay, 1972). The results of the present study are consonant with the original general hypotheses concerning the natural socialization of contingent self-reward in an achievement-oriented society. Future research might well be directed towards the elaboration of parameters other than task length and difficulty which come to determine level of contingent self-reinforcement. The self-judged quality or accuracy of performance is an example of such an additional parameter, but there are undoubtedly many others.

Table 1

Pilot Data

		Card Task		Arithmetic Task		Form Task	
		Short	Long	Short	Long	Short	Long
Time to completion	Easy	53.1	92.4	36.5	67.0	46.3	58.8
(Time in seconds)	Difficult	52.5	94.8	35.2	52.9	61.1	69.0
Difficulty Rating	Easy	1.12	1.41	1.24	1.41	1.53	1.29
(Scale = 1-5)	Difficult	1.94	2.24	2.06	2.00	2.24	1.76

Table 2

Mean Number of Seconds Required to Complete Tasks of Various Lengths and Difficulty Levels

Main Effects

Task	Card	Arithmetic	Form
	73.34	50.91	52.77
Length	Short	Long	
	37.11	80.90	
Difficulty	Easy	Hard	
	54.04	63.97	

Interactions

Task X Length		Card	Arithmetic	Form
	Short	44.30	27.20	39.84
	Long	102.40	74.63	65.69
Task X Difficulty		Card	Arithmetic	Form
	Easy	68.42	49.42	44.30
	Hard	78.27	52.41	61.23
Sex X Difficulty		Male	Female	
	Easy	55.43	52.67	
	Hard	68.68	59.26	

Task X Length X Difficulty		Card		Arithmetic		Form	
		Short	Long	Short	Long	Short	Long
	Easy	40.47	96.36	28.94	69.91	28.09	60.00
	Hard	48.13	108.41	25.47	79.34	51.59	70.88

Table 3

Intercorrelation: Time Required to Complete Each Version of Each Task

N = 32

(1) Card Task

	Short-easy	Short-hard	Long-easy	Long-hard
Short-easy	----	.54**	.56**	.35*
Short-difficult		----	.42*	.65**
Long-easy			----	.45**
Long-difficult				----

(2) Arithmetic Task

	Short-easy	Short-hard	Long-easy	Long-hard
Short-easy	----	.18	.33	.30
Short-difficult		----	.22	.28
Long-easy			----	.27
Long-difficult				----

(3) Form Task

	Short-easy	Short-hard	Long-easy	Long-hard
Short-easy	----	.65**	.61**	.56**
Short-difficult		----	.70**	.66**
Long-easy			----	.59**
Long-difficult				----

* $p < .05$

** $p < .01$

Table 4

Intercorrelations: number of tokens dispensed following completion of each version of each task

N = 32

(1) Card Task

	Short-easy	Short-hard	Long-easy	Long-hard
Short-easy	----	.50**	.63**	.32
Short-difficult		----	.59**	.22
Long-easy			----	.26
Long-difficult				----

(2) Arithmetic Task

	Short-easy	Short-hard	Long-easy	Long-hard
Short-easy	----	.73**	.64**	.63**
Short-difficult		----	.43**	.46**
Long-easy			----	.66*
Long-difficult				----

(3) Form Task

	Short-easy	Short-hard	Long-easy	Long-hard
Short-easy	----	.77**	.69**	.59**
Short-difficult		----	.61**	.46**
Long-easy			----	.53**
Long-difficult				----

*$p < .05$

**$p < .01$

Table 5

Intercorrelation of Time to Complete a Task and Number of Tokens Self Dispensed Following Completion

$N = 26$

	Card	Arithmetic	Form
Short-easy	.03	.05	-.29
Short-difficult	.13	.09	-.09
Long-easy	.29	.16	-.18
Long-difficult	.18	.09	-.34

Median $r = .09$

References

Bandura, A.,& Kupers, Carol J. Transmission of patterns of self-reinforcement through modeling. Journal of Abnormal and Social Psychology, 1964, 69, 1-9.

Bandura, A.,& Whalen, Carol K. The influence of antecedent reinforcement and divergent modeling cues on patterns of self-reward. Journal of Personality and Social Psychology, 1966, 3, 373-382.

Kagan, J. Individual differences in the resolution of response uncertainty. Journal of Personality and Social Psychology, 1965, 2, 154-160.

Masters, J. C. Effects of social comparison upon subsequent self-reinforcement behavior in children. Journal of Personality and Social Psychology, 1968, 10, 391-401.

Masters, J. C. Effects of success, failure, and reward outcome upon contingent and noncontingent self-reinforcement. Developmental Psychology, 1972, 7, 110-118.

Masters, J. C. Effects of age and social comparison upon children's noncontingent self-reinforcement and the value of a reinforcer. Child Development, 1973, 44, 111-116.

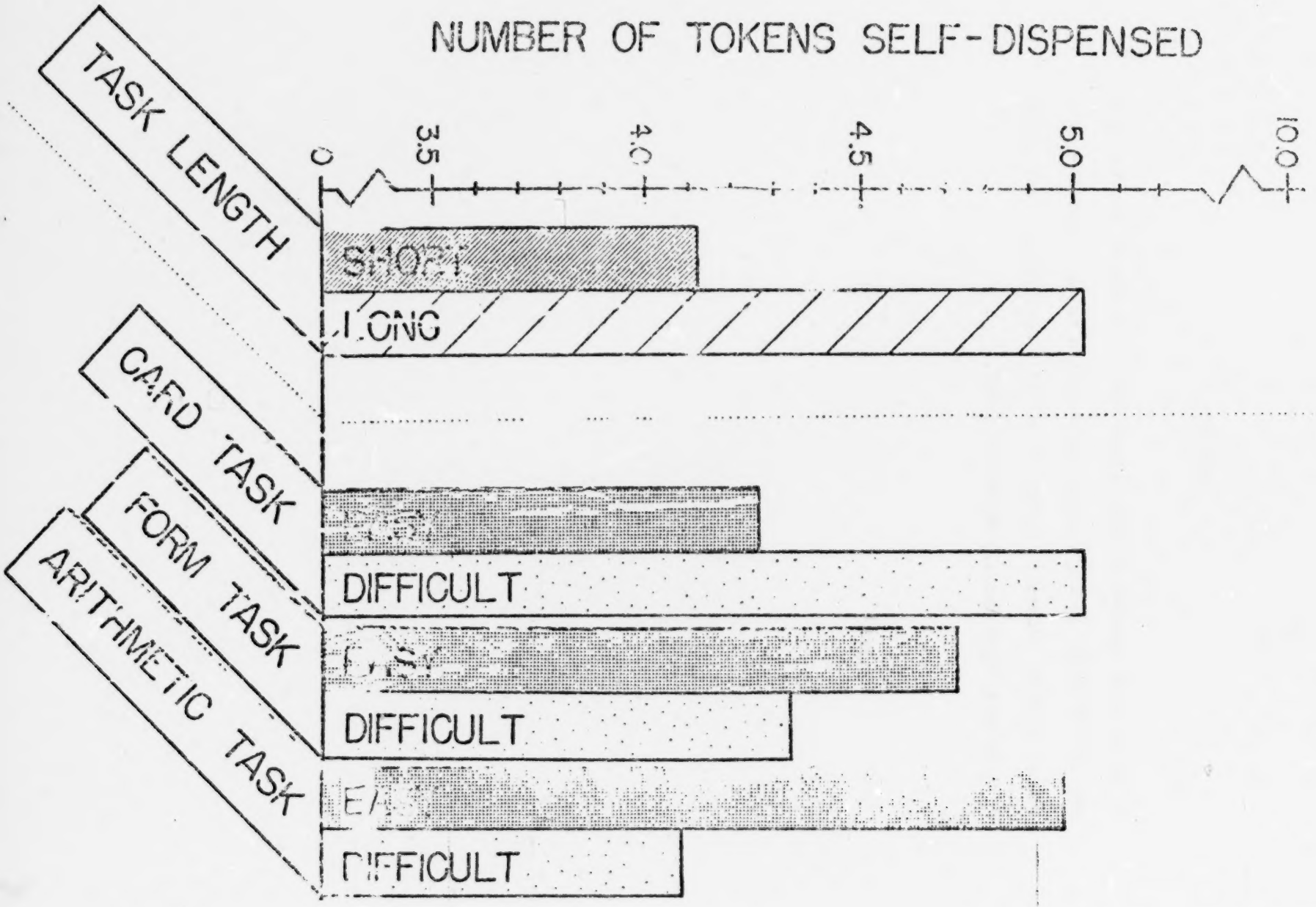
Masters, J. C.,& Peskay, J. Effects of race, socioeconomic status, and success or failure upon contingent and noncontingent self-reinforcement in children. Developmental Psychology, 1972, 7, 139-145.

Mischel, W. Personality and Assessment. New York: Wiley, 1968.

Mischel, W., Coates, D. B., & Raskoff, A. Effects of success and failure on self-gratification. Journal of Personality and Social Psychology, 1968, 10, 381-390.

Mischel, W.,& Liebert, R. M. Effects of discrepencies between observed and imposed reward criteria on their acquisition and transmission. Journal of Personality and Social Psychology, 1966, 3, 45-53.

Ridberg, E. H., Parke, R. D., & Hetherington, E. M. Modification of impulsive and relective cognitive styles through observation of film mediated models. Developmental Psychology, 1971, 5, 369-377.


NUMBER OF TOKENS SELF-DISPENSED
0
3.5
4.0
4.5
5.0
10.0
TASK LENGTH
SHORT
LONG
CARD TASK
FORM TASK
DIFFICULT
DIFFICULT
ARITHMETIC TASK
DIFFICULT

FOOTNOTE

An abbreviated account of this experiment was presented at the 1973 biennial Meetings of the Society for Research in Child Development. Author Masters' Address: Institute of Child Development, University of Minnesota, Minneapolis, Minnesota 55455.